

WHAT IS CLAIMED IS:

1. A tire having at least one component of a rubber composition comprised of, based upon 100 parts by weight of elastomer (phr),

5 (A) 100 phr of elastomers comprised of:

(1) about 30 to about 80 phr of a styrene/butadiene elastomer composite (SBR Composite) comprised of a styrene/butadiene elastomer (SBR-1) and a functionalized styrene/butadiene elastomer (SBR-2) which contains at least one silicon atom within said elastomer, and pendent silanol and/or siloxy groups therefrom, and as a part of the elastomer chain to thereby divide said elastomer into at least two segments thereof (SBR-2A and SBR-2B) with the silicon atom a of said pendent silanol and/or siloxy group therebetween, wherein said SBR Composite is thereby comprised of a polymodal molecular weight configuration comprised about 35 to about 55 weight percent thereof (SBR-1) having a number average molecular weight (Mn) in a range of about 200,000 to about 300,000 and, correspondingly, about 65 to about 35 weight percent thereof of said (SBR-2) having a number average molecular weight (Mn) in a range of about 400,000 to 550,000; wherein said SBR Composite contains from zero to a maximum of ten weight percent of at least one additional styrene/butadiene elastomer (SBR-3) pendent from said silicon atom having an number average molecular weight (Mn) of greater than 550,000, alternatively between 550,000 and about 650,000 and having styrene contend and Tg values in the range thereof of said SBR-2 and SBR-2;

25 (2) about 20 to about 70 phr of at least one additional diene-based elastomer; and

(B) about 35 to about 100 phr of particulate reinforcement comprised of

30 (1) about 35 to about 85, phr of at least one of synthetic amorphous precipitated silica and silica treated carbon black which contains domains of silica on its surface, and mixtures thereof, wherein said synthetic silica and said silica domains contain hydroxyl groups (e. g. silanol groups) on their surfaces, and

(2) from zero to about 15 phr of carbon black,

(C) a coupling agent having:

- (1) a moiety reactive with
- (a) said hydroxyl groups contained on the surface of said silica and silica treated carbon black; and
- (b) said silanol and/or siloxy groups of said SBR Composite,
- 5 and;

(2) another moiety interactive with the polybutadiene portion of said SBR Composite and with said additional diene-based elastomer; and:

(D) optionally, about 2 to about 10 phr of a starch/plasticizer composite comprised of starch and plasticizer therefor of a weight ratio in a range of about 0.05/1 to about 4/1, wherein said starch/plasticizer composite has a softening point in a range of about 110°C to about 170°C and;

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(E) optionally said coupling agent as a combination of a bis-(3-triethoxysilylpropyl) polysulfide having an average of from 2 to 2.5 connecting sulfur atoms in its polysulfidic bridge and a bis-(3-triethoxysilylpropyl) polysulfide having an average of from 3 to 4 connecting sulfur atoms in its polysulfidic bridge,

15 wherein said polysulfide having an average of from 2 to 2.5 connecting sulfur atoms in its polysulfidic bridge is blended with said rubber composition in the absence of sulfur and sulfur vulcanization accelerator and wherein said polysulfide having an average of from 3 to 4 connecting sulfur atoms in its polysulfidic bridge is thereafter blended with said rubber composition in the presence of sulfur and at least one sulfur vulcanization accelerator; and

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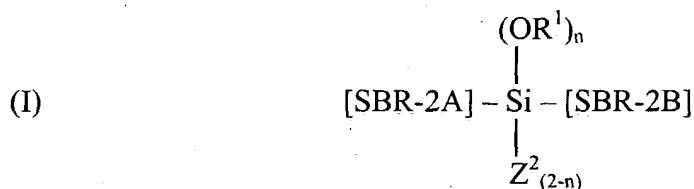
wherein said rubber composition is comprised of at least one of said starch/plasticizer composite and said combination of bis-(3-triethoxysilylpropyl) polysulfide coupling agents.

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2. The tire of claim 1 wherein said elastomer segments have a weight average molecular weight to number average molecular weight ratio (M_w/M_n) of not more than 2.

3. The tire of claim 1 wherein said functionalized styrene/butadiene elastomer (SBR-2) is of the general Formula (I):

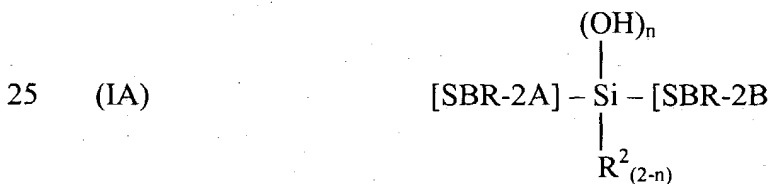
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wherein said [SBR-2A] and [SBR-2B] each have a bound styrene content in a range of from about 25 to about 35 percent, a vinyl 1,2-content in a range of about 50 to about 70 percent based on the butadiene component of the SBR, a Tg in a range of about -15°C to about -30°C; wherein the silicon (Si) atom is attached to a butadiene moiety of the respective SBRs; R¹ is selected from hydrogen, methyl, ethyl, propyl, butyl and phenyl groups, preferably from hydrogen (thereby forming a silanol group) or as a methyl or ethyl group (and therefore forming an alkoxy group); and Z² is selected from an additional SBR segment of said styrene content and said Tg, an alkyl radical containing from 1 to about 18 carbon atoms, or an aromatic radical containing from 6 to about 12 carbon atoms, preferably from said alkyl radicals and said aromatic radicals thereby yielding a linear silicon coupled elastomer; and where n is a value of from 1 to 2.

4. The tire of claim 3 wherein n is 2.

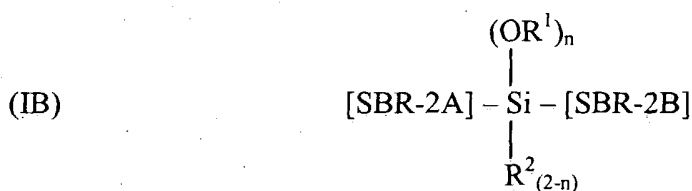
5. The tire of claim 1 wherein said SBR-2 is represented as Formula (IA):



wherein R² is selected from isopropyl, t-butyl, phenyl and tolyl radicals and n is a value of 1 to 2.

6. The tire of claim 5 wherein n is 2.

7. The tire of claim 1 wherein said SBR-2 is represented as Formula (IB):



wherein R^1 is selected from methyl, ethyl, propyl, butyl, and phenyl radicals and R^2 is selected from isopropyl, t-butyl, phenyl and tolyl radicals and n is a value of from 1 to 2.

8. The tire of claim 7 wherein n is 2.

9. The tire of claim 1 wherein said coupling agent is an organosulfur silane of the general formula (II):



wherein R^4 is an alkyl radical selected from at least one of methyl and ethyl radicals, preferably an ethyl radical, R^5 is an alkylene radical having from 1 to 18 carbon atoms, preferably from 2 through 4 carbon atoms, and x is a value in a range of 2 to 8, with an average of from 2 to about 2.6 or from about 3.5 to about 4.

10. The tire of claim 1 wherein said coupling agent is a bis(3-triethoxysilylpropyl) polysulfide having an average of from 2 to 2.6 connecting sulfur atoms in its polysulfidic bridge.

11. The tire of claim 1 wherein said precipitated silica, prior to blending with said elastomer(s), is:

(A) pre-treated with an alkylsilane of the general Formula (III) prior to blending with said elastomer(s) and said coupling agent;

(B) pre-treated with said coupling agent of formula (II);

(C) pre-treated with an organomercaptosilane of formula (IV), or

(D) pre-treated with a combination of said alkylsilane of Formula (III) with

and

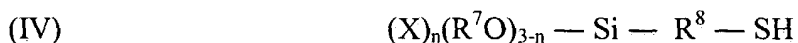
(1) said coupling agent of the general Formula (II) and/or

(2) said organomercaptosilane of Formulas (IV),
wherein said alkylsilane of the general Formula (III) is represented as:



wherein R^6 is an alkyl radical having from 1 to 18 carbon atoms,
preferably from 1 through 4 carbon atoms; n is a value of from 1 through 3; X is
a radical selected from the group consisting of halogens, preferably chlorine, and
alkoxy radicals selected from methoxy and ethoxy radicals, and

wherein said organomercaptosilane of the general Formula (IV) is
represented as:



wherein X is a radical selected from chlorine, bromine and from alkyl
radicals having from one through 4 carbon atoms; wherein R^7 is an alkyl radical
having from one through 4 carbon atoms; wherein R^8 is an alkylene radical
having from one through 4, carbon atoms; and n is an average value of from zero
through 3.

12. The tire of claim 11 wherein, for said Formula (IV), X is chlorine and R^7
is selected from methyl and ethyl radicals and n is an average value of about 3.

13. The tire of claim 11 wherein, for said Formula (IV), R^7 is an ethyl radical
and n is zero.

14. The tire of claim 11 wherein said alkylsilanes of formula (III) are selected
from at least one of the group consisting of trichloromethylsilane,
dichlorodimethylsilane, chlorotrimethylsilane, trimethoxymethylsilane,
dimethoxydimethylsilane, methoxytrimethylsilane, trimethoxypropylsilane,
trimethoxyoctylsilane, trimethoxyhexadecylsilane, dimethoxydipropylsilane,
triethoxymethylsilane and diethoxydimethylsilane.

15. The tire of claim 11 wherein said organomercaptosilanes of formula (IV) are selected from at least one of the group consisting of mercaptomethyltrimethoxysilane, mercaptoethyltrimethoxysilane, mercaptopropyltrimethoxysilane, mercaptomethyltriethoxysilane, mercaptoethyltripropoxysilane, mercaptopropyltriethoxysilane and mercaptopropyltrimethoxysilane.

16. The tire of claim 1 wherein said rubber composition contains from about 1 to about 10 phr of said starch/plasticizer composite.

17. The tire of claim 16 wherein starch/plasticizer composite is a composite of starch and synthetic plasticizer comprised of at least one of poly(ethylenevinyl alcohol) and cellulose acetate.

18. The tire of claim 1 wherein said coupling agent is a combination of a bis-(3-triethoxysilylpropyl) polysulfide having an average of from 2 to 2.5 connecting sulfur atoms in its polysulfidic bridge and a bis-(3-triethoxysilylpropyl) polysulfide having an average of from 3 to 4 connecting sulfur atoms in its polysulfidic bridge, wherein said polysulfide having an average of from 2 to 2.5 connecting sulfur atoms in its polysulfidic bridge is blended with said rubber composition in the absence of sulfur and sulfur vulcanization accelerator and wherein said polysulfide having an average of from 3 to 4 connecting sulfur atoms in its polysulfidic bridge is thereafter blended with said rubber composition in the presence of sulfur and at least one sulfur vulcanization accelerator.

19. The tire of claim 11 wherein said component rubber composition is exclusive of any appreciable content of in situ formed alcohol.

20. The tire of claim 19 wherein said component is a tire tread.